ISSN: 0975-833X

*Available online at http://www.journalcra.com*

*International Journal of Current Research*
*Vol. 11, Issue, 03, pp.2003-2007, March, 2019*

**DOI: https://doi.org/10.24941/ijcr.34550.03.2019**

**INTERNATIONAL JOURNAL OF CURRENT RESEARCH**

## RESEARCH ARTICLE

# IMMEDIATE EFFECT OF SUPERVISED SELF MYOFASCIAL RELEASE OVER THE PLANTARFASCIA ON LUMBAR AND HAMSTRING FLEXIBILITY

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**ARTICLE INFO**

*Article History:*
Received 17th December, 2018
Received in revised form
27th January, 2019
Accepted 09th February, 2019
Published online 31st March. 2019

*Key Words:*
Self Myofascial Release, Plantar Fascia, Hamstring, Flexibility.

**ABSTRACT**

Abridged elasticity in Hamstrings and Back leads to Back Pain, Muscle strains, etc. This aims, outcome of Supervised Self Myofascial Release over plantar fascia increasing Hamstring in addition to Lumbar Flexibility. Inclusion -exclusion criteria subjects were selected, informed consent taken. Screening done by Active knee extension. Subjects being randomly divided into 2 groups: Group A (experimental) treated under supervision, B (control) not given the intervention for time being. Pre and post Treatment were stastically analysed. Group B subjects treated post assessment Hence, it concluded Self Myofascial technique signifcantly improved Lumbar with Hamstring Flexibility.

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***Citation*: *Sidhesh Somne, Dr. Bindu Sarfare, PT. and Dr. Snehal Ghodey, PT.* 2019.** "Immediate effect of supervised self myofascial release over the plantarfascia on lumbar and hamstring flexibility", *International Journal of Current Research*, 10, (03), 2003-2007.

## INTRODUCTION

Flexibility is the capacity to move a single or series of joints effortlessly and easily through an unhindered Pain free ROM. When hampered in the Hamstringsis a pre-disposing factor for Low back pain, reduced Lumbar ROM, prone to strain Injuries. Hamstring elasticity gets reduced due to the Fascia getting restricted due to disease, inactivity, inflammation. Hence there is general decrease in flexibility of Hamstrings supplementing reduced knee ROM (active/passive) (Carolyn Kisner and Lynn Allen Colby?). A schematic map of body's fascia connections namely Anatomical Trains suggesting, any tension in the anatomical trains have a unfavourable result in Hamstring Flexibility (Churchill Livingstone Myers, 2014). Myofascial Release couldbe used as an instrument to release fascial tension and increase general flexibility (Churchill Livingstone Myers, 2014). Issues in relation to the plantar fascia may be associated by tight hamstrings and lumbar lordosis. Mayer's concept (Churchill Livingstone Myers, 2014). Joins individual muscles into functional complexes within fascial planes each with a defined anatomy and 'meaning' inhuman movement. The "anatomy train" suggested to be most related to lumbar spine and hamstrings is the superficial back line (SBL) through which muscles are connected by one neural system which passes through duramater. Plantar Fascia originates from the Medial Tubercle of Calcaneus and inserts over the proximal phalynx of the toes. Its main function is to provide Static stability to the arches of foot and aids as a shock absorber when Gait cycle occurs (MacDonald *et al*., 2013). The SBL contains the plantar fascia and short toe flexors, muscle group triceps surae, hamstrings, Sacro tuberous ligament, fascia of the Sacro lumbar area, erector spinae, and Epicranial fascia which ranges and attaches to the supra orbital ridge on the anterior surface of the cranium (Wells and Dillon, 1952). Myofascial release (MFR) has been described as an umbrella term for a wide variety of manual therapy techniques in which pressure is applied to muscle and fascia. When Myofascial release is applied over a tissue, there is heat generated due to friction which causes sliding of the fascia and reduces its adherence and thus leads to increased Range of Motion and increment in flexibility (Carolyn Kisner and Lynn Allen Colb).

## MATERIALS AND METHODS

This experimental study was carried at MAEER's Physiotherapy College, Talegaon on normal individuals with sample size of 60 individuals including Males and Females under the age group of 18 to 29 years.

**Study Design:** Experimental Study

**Study Location:** MAEER's Physiotherapy College, Talegaon Dahbade

**Study Duration:** August 2018 to February 2019

**Sample Size:** 60

**Sampling type:** Purposive Random Sampling

**Subjects and Selection Method:** The study population was based on Normal individuals who were healthy based on PAR-Q[(24)] questionnaire. Subjects with inclusion criteria were

randomly allotted to 2 groups using the software Research Randomizer (https://www.randomizer.org/) with 30 subjects each

**Inclusion criteria**

- Age Group 18 to 29, Males and Females,
- Inability to actively do at least 20-degree knee end extension,
- The person should be Healthy as per PAR Q questionnaire.

**Exclusion criteria**

- Fibromyalgia
- Plantar fasciitis
- Red Flags for Myofascial Release
- Any Surgery or injury pertaining to Hamstrings
- Knee Extension lag due to knee stiffness
- Benign Hypermobility of Joints judged by Beighton's score (4 and below)

**Procedure Methodology:** A total of 71 subjects were evaluated, out of which 11 subjects which did not meet the inclusion criteria were excluded. Subjects were later randomized into two groups of 30 each, 'Group A' being Experimental and 'Group B' being control. Canadian Sit and Reach test (Scott Davis *et al*.; Bakirtzoglou *et al*., 2010; Wells and Dillon, 1952). Was selected in this study as it is able to tension both Hamstrings and Lumbar spine and hence is recommended for measuring their flexibility. As per American College of Sports Medicine (ACSM) (Kaminsky and Bonzheim, 2006). Three measurements were recorded, held for 2 seconds and were averaged.

Active knee Extension (Mohamad Shariff Hamid *et al*., 2013) is recommended for measuring Hamstring length because of its significance and reliability. Subjects in supine were instructed to flex both Hip and Knees to 90 degrees and actively Extend Knee. A goniometer was used to document 3 Knee extension ranges that were averaged.

**Group A (Experimental):** Subjects sitting on a chair were taught to roll Blackroll$^{TM}$ (Oskar Brengesjö and Jonathan Lohaller). Ball from the right heel to forefoot for 90 seconds (Barnes). Keeping Numerical Rating Scale (NRS) score for pain at 4/10. Post readings were recorded and were statistically analysed.

**Group B (Control):** Subjects were not given any treatment for time being. Post assessment was done. Subjects were taught the intervention. Data was analysed statistically.

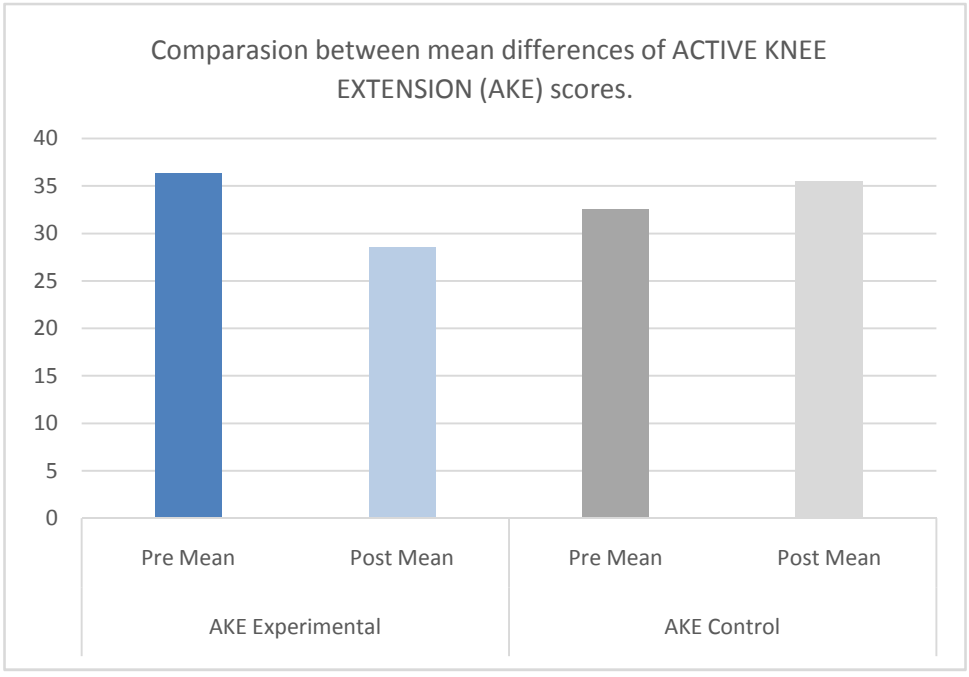
**Statistical Analysis:** Data was analysed using 'Graph Pad In Stat v.3 (Healey *et al*., 2014). Student's *t*-test was used to ascertain the significance of differences between mean values of two continuous variables. Confidence interval was kept at 95%. Within group analysis was done using *paired t test* and between group analysis was done using *paired t test.* The level $P < 0.05$ was considered as the cutoff value or significance.

## RESULT

Table 1. Shows comparison between Active Knee Extension Range of Motion of Group A (Experimental) and Group B (control) pre and post treatment by paired t test. There was 8.5 degrees increment in AKE for group A, while group B being 2.93. The p value for Group A was 0.005 which was considered statistically significant while Group B was 0.12, hence not significant.

**Table 1. Active Knee Extension for Group A and B**

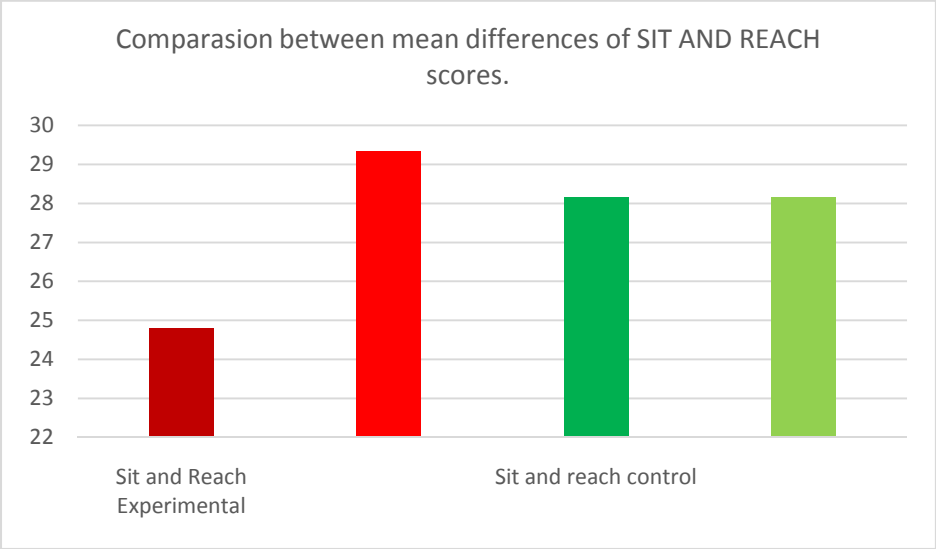
| | Pre Mean (degrees) | Post Mean (degrees) | Mean Difference | P value | Significance | Test used |
|---|---|---|---|---|---|---|
| Group A (Experimental) | 36.30 ±9.20 | 28.53 ±8.36 | 8.5 ± 11.53 | 0.005 | Significant | Paired t test |
| Group B (Control) | 32.53 ±12.16 | 35.46 ±9.52 | 2.93± 13.76 | 0.12 | Not Significant | |




**Interpretation:** Since in Group A, $p<0.05$ ($p = 0.005$) it is significant and for Group B, $p>0.05$ ($p= 0.12$) it is not significant.

**Table 2. Sit and Reach for group A and B**

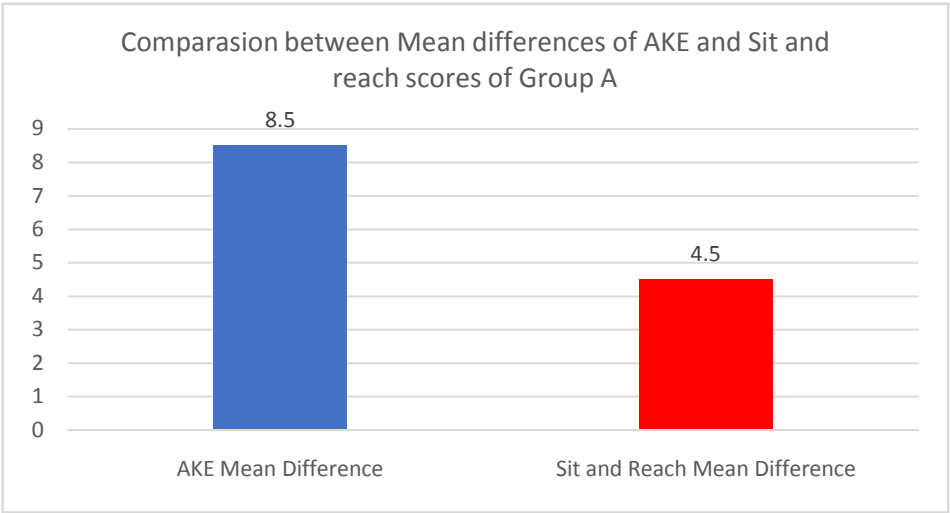
| | Pre-Mean (cm) | Post Mean (cm) | Mean Difference | P value | Significance | Test used |
|---|---|---|---|---|---|---|
| Group A(Experimental) | 24.80 ±5.96 | 29.35 ±5.92 | 4.50 ± 10.70 | 0.015 | Significant | Paired t test |
| Group B (Control) | 28.16 ±8.13 | 28.16 ±7.64 | 0 ± 0.6 | 0.5 | Not Significant | |




**Interpretation**: Since in Group A, p<0.05 (p = 0.015) it is significant and for Group B, p>0.05 (p= 0.5) it is not significant.

**Table 3. Group A Post Treatment Mean Differences**

| Post AKE (degrees) | Post Sit and Reach (cm) | p value | Significance | Test used |
|---|---|---|---|---|
| 8.5 ± 11.53 | 4.50 ± 10.70 | 0.085 | Not quite significant | Unpaired t test |




**Interpretation**: Since p>0.05 (p = 0.085) it is not quite significant.

## DISCUSSION

The current research was preferred in order to relate effectiveness of SMFR over plantar-fascia with respect to the flexibility in Hamstring with Lower Back. A statistical analysis of Group A where subjects were treated with SMFR technique showed a notable increment in Active Knee Extension, also Sit and Reach scores after treatment with p value lesser than 0.05 making it statistically significant. On the other hand, analysing group B showed comparatively less improvement in AKE and Sit and Reach scores post treating them (p>0.05) not making it statistically significant. Myers T *et al* in his book 'Anatomical Trains' (3rd edition), Myers (2014, p78-79) proved the existence of a Fascia that connects the Plantar aponeurosis, Gastro-soleus, Hamstrings, Sacrotuberous ligaments, Erector spinae, Anterior cranial fascia together and named it the Superior Back Line (SBL) (Simmonds *et al*., 2012; Churchill Livingstone Myers, 2014). There is a presence of direct and indirect communications between fascia and muscles that stretch the aponeurosis allowing tension transfer over long distances (Kassolisk *et al*. 2007) known as Tensegrity. Thus, a therapist can influence tension in proximal muscles by massaging distal muscles. This was practically achieved by recording EMG activity of Deltoid muscle by massaging the Brachioradialis of the same extremity and found a notable activity in both muscles (Krzyszt of Kassolika). Foam rollers often find the usage in clinical practice and yoga (Scott *et al.,* 2015). Curran *et al.* (2008) compared 2 different types of foam rollers viz Bio Foam Roller (BFR) and Multi level Rigid

Roller (MRR) and demonstrated that the material of foam roller determines the amount of Point Pressure exerted on the fascia and proved MRR exerts more pressure, being harder than BFR. (Scott *et al*., 2015). Brengesjö *et al*. (2017) studied Effects of foam rolling on ankle joint ROM and hamstring flexibility using 'BlackRoll$^{TM}$ ball (8cm)' to roll the plantar fascia, similar to this study and had found significant results (Oskar Brengesjö and Jonathan Lohaller, ?). Effect of roller massager over the hamstrings increases sit and reach scores without performance impairments (Sullivan et al., 2013). Kane Y *et al.* (1992) proved the use of Modified Active knee extension to measure Hamstring length using 29 subjects, while AKE test was performed in 5 different positions (Chris and Skarabot, 2015). A systemic study performed by Chris, Škarabot, (2015) suggested Self Myofascial Release to be an alternative to static stretching prior exercise or training sessions. Acutely, SMFR seems to increase flexibility and reduce muscle soreness but does not impede athletic performance (MacDonald *et al*., 2013; Scott *et al*., 2015). It may lead to improved arterial function, improved vascular endothelial function, and increased parasympathetic nervous system activity acutely, which could be useful in recovery. There is conflicting evidence whether SMFR can improve flexibility long-term (Scott *et al*., 2015; Mohr *et al*., 2014). Effects of Foam Rolling include 1. Stimulation of mechanoreceptors that in turn alters fluid dynamics and tissue metabolism. 2. The warmth produced causes the tissues to become viscous (1997 Barnes *et al*.) Furthurmore, there is stimulation of Golgi tendon that in turn stimulates Stretch receptors (Scott *et al*., 2015; Curran *et al*., 2008) 3. Foam roller application if found to exert point pressure over the fascia (Healey *et al*., 2014; Curran *et al*., 2008). This point pressure exerted on the fascia by foam rollers causes it to get stretched (Healey *et al*., 2014), friction increases tissue temperature (Scott *et al*., 2015; Curran *et al*., 2008) and causes the fascia to attain a fluid like state and causes the breaking of fibrous adhesions between different layers of fascia (Barnes; Healey *et al*., 2014). Hence the above points could be the reason, Group a showed significant results in Sit and Reach and AKE scores.

**Conclusion**

Group A showed statistically significant difference between AKE and Sit and Reach scores ($p<0.05$) whereas group B did not show any statistical significance ($p>0.05$) hence, Self-Myofascial Release improves Hamstring flexibility with Lumbar Flexibility.

## REFERENCES


An acute bout of static stretching: effects on force and jumping performance. A comparison of the pressure exerted on soft tissue by 2 myofascial rollers. *J Sport Rehabil.*, 2008 Nov;17(4):432-42.

Bakirtzoglou, P., Ioannou, P. and Bakirtzoglou, F. 2010. Evaluation of hamstring by using two different measuring instruments. SportLogia 6, 2: 28-32

Barnes, M. F. The basic science of myofascial release: morphologic change in connective tissue.

Behm, DG., Button, DC. and Butt, JC. 2001. Factors affecting force loss with prolonged stretching. *J Appl Physiol.,* 26(3):261-72.

Boyle, K., Witt, P. and Riegger-Krugh, C. 2003. Intrarater and interrater reliability of the Beighton and Horan Joint Mobility Index. *J. Athl. Train.,* 38 (4): 281-285.

Carolyn Kisner and Lynn Allen Colby. Therapeutic Exercise foundation & techniques.

Chris, B. and Skarabot, J. 2015. Effects of Self-Myofascial Release: A Systematic Review, Journal of Bodywork & Movement Therapies. J BodywMovTher. 2015 Oct;19(4):747-58. doi: 10.1016/j.jbmt.2015.08.007. Epub, 28.

Churchill Livingstone Myers, T. 2014. Anatomy Trains: Myofascial Meridians for Manual and Movement Therapists, third ed Elsevier, United States of America.

Curran, P., Fiore, R. and Crisco, J. 2008. A comparison of the pressure exerted on soft tissue by 2 myofascial rollers. *J. Sport Rehabil.,* 17 (4); 432-442.

Geoffrey, C. Urbanaik and Scott Plous - Research Randomizer. (https:\\www.randomizer.org).

Healey, KC., Hatfield, DL., Blanpied, P., Dorfman, LR. and Riebe, D. 2014. The Effects of Myofascial Release with Foam Rolling on Performance. *Journal of Strength and Conditioning Research,* 28(1):61–8. Available from: http://dx.doi.org/10.1519/jsc.0b013e3182956569.

Kaminsky, LA. and Bonzheim, KA. 2006. American College of Sports Medicine (ACSM) Resource Manual for Guidelines for Exercise Testing and Prescription, fifth ed. Lippincott Williams & Wilkins, Philadelphia.

Kane, Y. and Bernasconi, J. 1992. Analysis of a Modified Active Knee Extension Test. Journal of Orthopaedic & Sports Physical Therapy.1992 Mar;15(3):141–6. Available from: http://dx.doi.org/10.2519/jospt. 15.3.141.

Krzyszt of Kassolika, Anna Jasko´lskab, Katarzyna Kisiel-Sajewiczb, JarosławMarusiakb, Adam Kawczyn´skib and Artur Jasko´lskib. Tensegrity principle in massage demonstrated by electro- and mechanomyography.

MacDonald, GZ., Penney, MDH., Mullaley, ME., Cuconato, AL., Drake, CDJ., Behm, DG., *et al*., 2013. An Acute Bout of Self-Myofascial Release Increases Range of Motion Without a Subsequent Decrease in Muscle Activation or Force. *Journal of Strength and Conditioning Research*, 27(3):812–21.

Manheim, CJ. 2001. The myofascial release manual. Thorofare: Slack, pp 23 – 28.

Mohamad Shariff, A., Hamid, Mohamed Razif Mohamed Ali, Ashril Yusof, 2013. Interrater and Intrarater Reliability of the Active Knee Extension (AKE) Test among Healthy Adults *J. Phys. Ther. Sci., 25:* 957–961.

Mohr, AR1., Long, BC. and Goad, CL. 2014. Effect of foam rolling and static stretching on passive hip-flexion range of motion. *J Sport Rehabil.,* 23(4):296-9. doi: 10.1123/jsr. 2013-0025. Epub 2014 Jan 21.

NRS 4/10.

Orthopedic Physical Assessment – David J Magee.

Oskar Brengesjö, Jonathan Lohaller; Effects of foam rolling on ankle joint ROM and hamstring flexibility.

Scott Davis, D., Rich O Quinn, Chris T Whiteman, Jason D Williams, and Corey, R. Young Division of Physical Therapy, Department of Human Performance and Exercise Science,West Virginia University, Morgantown, West virginia"concurrent validity of four clinical tests used to measure hamstring flexibility".

Scott, W., Cheatham, PT., Morey, J., Kolber, PT, PhD, OCS, Matt Cain, MS and Matt Lee, PT, MPT. 2015. The effects of self-myofascial release using a foam roll or roller massager on joint range of motion, muscle recovery, and

performance: a systematic review. *Int J Sports Phys Ther.,* 10(6): 827–838.

Scott, W., Cheatham, PT., Morey, J., Kolber, PT., PhD, OCS, Matt Cain, MS. and Matt Lee, PT, MPT. 2015. the effects of self-myofascial release using a foam roll or roller massager on joint range of motion, muscle recovery, and performance: a systematic review. *Int J Sports Phys Ther*., 10(6): 827–838.

Simmonds, N., Miller, P. and Gemmell, H. 2012. A theoretical framework for the role of fascia in manual therapy. *Journal of Bodywork and Movement Therapies,* 16(1):83–93.

Sullivan, K., Silvey, D., Button, D. and Behm, D. 2013. Roller-massage application to the hamstrings increases sit- and reach range of motion within five to ten seconds without performance impairments. *Int. J. Sports Phys. Ther.,* 8 (3), 228-236.

Sung-Hak Cho, Soo-Han Kim and Du-Jin Park, 2015. Comparision between application of Sub occipital inhibition and Self myofascial release. *J. Phys. Ther. Sci.,* 27: 195- 197.

Thomas, S., *et al*., 1992. Revision of Physical Activity Readiness Questionnaire (PAR-Q) *Can J Sport Sci.,*

Wells, K.F. and Dillon, E.K. 1952. The sit and reach: A test of back and leg flexibility. *Res. Q. for Exerc. Sport*. 23, pp. 115-118.

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